

THAT WHICH IS CLAIMED IS:

1. A method for increasing caliper control of a fibrous web as the web is wound onto a roll, the method comprising the steps of:

winding a fibrous web onto a roll to form a wound product, the web
5 containing cellulosic fiber;

conveying the web through a nip prior to winding the web onto the roll, the nip applying a pressure to the web, the nip being configured to selectively decrease the caliper of the web by increasing the pressure of the nip;

applying the pressure as the web is wound onto the roll to influence
10 caliper of the fibrous web; and

adjusting the pressure applied to the web by the nip as the web is wound onto the roll wherein the nip pressure is increased as the diameter of the wound product is increased in order to compensate for caliper reduction in the web as the diameter of the wound product increases.

2. The method as in claim 1, wherein applying the pressure to the fibrous web occurs after a paper making process and before the web is wound onto a parent roll.

3. The method as in claim 1, wherein applying the pressure to the fibrous web occurs in a converting line as the fibrous web is being unwound from a parent roll and wound onto a secondary roll.
20

4. The method as in claim 1, wherein applying the pressure to the fibrous web occurs as the fibrous web is being unwound from a roll and onto a packaging roll.

5. The method as in claim 1, wherein the pressure is dependent on the diameter of the roll.

6. The method as in claim 1, further comprising the steps of monitoring the caliper of the fibrous web with a sensing device and adjusting the pressure based on measurements of the caliper from the sensing device.

7. The method as in claim 1, wherein the pressure to the fibrous web is applied by a calender roll.

8. The method as in claim 1, wherein the pressure to the fibrous web is applied by a converting line calender roll, the converting line calendar roll configured to sense the caliper and operable to control the caliper via a closed-loop feedback.

9. The method as in claim 1, wherein the pressure to the fibrous web can be adjusted remotely in precise micro-adjustments.

10. A method for increasing caliper control of a tissue the method comprising the steps of:

providing a tissue having a first side and a second side, the tissue to be wound onto a roll;

controlling a pressure that a calendering device applies to the tissue in such a manner that the pressure increases uniformity of caliper of the

tissue being wound onto the roll from a core region of the roll to an outer region of the roll;

applying the pressure to at least one of the sides of the tissue with the calendaring device; and

5 winding the tissue onto the roll after the pressure is applied to the tissue by the calendaring device.

11. The method as in claim 10, wherein the pressure increases as a diameter of the roll increases.

10 12. The method as in claim 11, further comprising the step of measuring the diameter of the roll to determine the adjustment to the pressure as the tissue is wound onto the roll.

13. The method as in claim 10, wherein applying the pressure to the tissue occurs after a tissue machine and before the tissue is wound onto a parent roll.

15 14. The method as in claim 10, wherein applying the pressure to the tissue occurs in a converting line as the tissue is being unwound from a parent roll and wound onto a secondary roll.

20 15. The method as in claim 10, wherein applying the pressure to the tissue occurs as the tissue is being unwound from a roll and onto a packaging roll.

10059429-123064

16. The method as in claim 10, further comprising the steps of monitoring the caliper of the tissue with a sensor and controlling the pressure based on measurements of the caliper from the sensor.

5 17. The method as in claim 16, wherein the monitoring and controlling steps form a closed-looped feedback process.

18. The method as in claim 10, wherein the pressure to the fibrous web is applied by a set of calender rollers.

19. The method as in claim 18, wherein the pressure to the fibrous web can be adjusted remotely in precise micro-adjustments.

10 20. The method as in claim 10, wherein the roll is wound on a center-winding device.

21. A system for controlling the caliper of a fibrous web, the apparatus comprising:

15 a calender device that forms a nip through which the fibrous web is conveyed, the nip of the calender device applying pressure to a first side and a second side of the fibrous web;

a reel disposed within an operable distance to the calender device, the reel having a cylindrical surface extending in an axial manner;

20 a roll which may be slidably disposable onto and removable from the cylindrical surface of the reel, the roll interacting with the fibrous web in a manner in which the fibrous web is wound onto the roll; and

10069129-10001

an adjustment device integrally disposed to the calender device, the adjustment device allowing the pressure created by the nip of the calender device to be adjusted to permit the pressure to increase on the first and second side of the fibrous web as diameter of the roll increases, thus increasing
5 uniformity of the caliper of the fibrous web.

22. The system as claim 21, wherein the calender device forms an open gap.

23. The system as claim 21, wherein the calender device forms a closed nip.

10 24. The system as claim 21, further comprising a control device operably linked to the adjustment device, the control device remotely regulating the pressure generated by the nip of the calender device by controlling the adjustment device in such a manner that the adjustment device alters the nip in micro-increments as directed by the control device.

15 25. The system as claim 24, further comprising a roll sensing device in communication with the control device, the roll sensing device monitoring the diameter of the roll as the fibrous web is wound onto the roll to provide information for regulating the pressure generated by the nip of the calender device.

20 26. The system as claim 24, further comprising a caliper sensing device in communication with the control device, the caliper sensing device measuring the caliper of the fibrous web as the fibrous web is wound onto the roll

10069129-13064

to provide information for regulating the pressure generated by the nip of the calender device.

27. The system as claim 26, wherein the caliper sensing device is a non-contact laser.

5 28. The system as claim 26, wherein the caliper sensing device is a contact sensor.

29. The system as in claim 21, wherein the calender device is positioned after a tissue machine and before a reel for a parent roll.

10 30. The system as in claim 21, wherein the calender device is positioned in a converting line between a reel for a parent roll and a reel for a secondary roll.

31. The system as in claim 21, wherein the calender device is positioned before a reel for a packaging roll.

15 32. The system as in claim 21, wherein the reel is a center-winding device.

33. The system as in claim 21, wherein calender device is a set of calender rollers.

34. An apparatus for controlling the caliper of a tissue, the apparatus comprising:

20 a set of calender rollers forming a nip, the calender rollers transporting the tissue through the nip and applying pressure to the tissue;

a center-winding device disposed downstream from the calender rollers in the tissue's direction of travel, the center-winding device having a cylinder extending therefrom onto which a roll may be placed; and

5 a setting device configured with the calender rollers, the setting device permitting control of the pressure created by the calender rollers on the tissue in such a manner that the pressure increases uniformity of caliper of the tissue being wound onto the roll from a core region of the roll to an outer region of the roll.

10 35. An apparatus as claim 34, further comprising a control apparatus in communication with the setting device, the control apparatus remotely regulating the calender rollers by instructing the setting device to adjust the calender rollers in micro-increments, thereby controlling the pressure the calender rollers place upon the tissue.

15 36. An apparatus as claim 35, further comprising a caliper sensor operably linked to the control apparatus, the caliper sensor determining the caliper of the tissue as the tissue is wound onto the roll and communicating the caliper to the control apparatus for regulating the pressure generated by the calender rollers.

20 37. An apparatus as claim 36, wherein the caliper sensor is a non-contact laser.

38. An apparatus as claim 36, wherein the caliper sensor is a contact sensor contacting the tissue.

10094943001
T000T 6220T

39. An apparatus as claim 35, further comprising a roll thickness sensor in communication with the control apparatus, the roll thickness sensor measuring the diameter of the roll as the tissue is wound onto the roll and communicating the diameter to the control apparatus for regulating the pressure generated by the calender rollers.

40. An apparatus as in claim 34, wherein the calender rollers are positioned after a tissue machine and before a center-winding device for a parent roll.

41. An apparatus as in claim 34, wherein the calender rollers are positioned in a converting line between a center-winding device for a parent roll and a center-winding device for a secondary roll.

42. An apparatus as in claim 34, wherein the calender rollers are positioned before a center-winding device for a packaging roll.

43. An apparatus as in claim 34, wherein the center-winding device is a center-winding reel.

44. An apparatus as claim 34, wherein the calender rollers forms an open gap.

45. An apparatus as claim 34, wherein the calender rollers forms a closed nip.